Q1. With the aid of diagrams, describe the following digitization formats:
(i) 4:2:2,  (ii) 4:2:0,  (iii) SIF,
(iv) CIF  (v) QCIF      (vi) S-QCIF
For each format, state the temporal resolution and the sampling rate used for the luminance and the two color difference signals. Give an example application of each format.

Q2. Derive the bit rate that results from the digitization of a 525-line and a 625-line system using the 4:2:0 digitization format and interlaced scanning. Hence derive the amount of memory required to store a 2-hour movie/video.

Q3. With the aid of diagrams, explain the meaning of the following terms relating to graphical images:
(i) pixels,     (ii) video graphics array,
(iii) image object,  (iv) object attributes,
(v) open and closed object shapes,  (vi) rendering,
(vii) bit-map format

Q4. How is formatted text different from unformatted text? Hence describe the meaning of the term 'text' and 'document formatting commands'. What is the origin of the acronym WYSIWYG?

Q5. Fig. Q5 shows a speech signal.
(i) Determine its dynamic range.
(ii) Determine the magnitude of the maximum quantization noise if a n-bit quantizer is used to digitize the signal.
(iii) Suggest how many bits should be used to quantize a sample of the signal so as not to bury the signal samples of the minimum signal amplitude.
(iv) What's the quantization interval (step size) of your selected quantizer?
(v) Determine the Peak signal-to-noise level.
(vi) The signal-to-noise ratio varies according to the magnitude of signal samples. Do you think that it is ideal? If it is not ideal, what should we do?